

In the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (original) A high-strength hot-rolled steel sheet excellent in shape fixability, wherein ferrite or bainite is the maximum phase in terms of percent volume,

satisfying all of the following at least at 1/2 of the sheet thickness:

(1) a mean value of X-ray random intensity ratios of a group of  $\{100\}\langle 011\rangle$  to  $\{223\}\langle 110\rangle$  orientations is 2.5 or more,

(2) a mean value of X-ray random intensity ratio of three orientations of  $\{554\}\langle 225\rangle$ ,  $\{111\}\langle 112\rangle$ ,  $\{111\}\langle 110\rangle$  is 3.5 or less,

(3) X-ray random intensity ratio of  $\{100\}\langle 011\rangle$  is larger than that of  $\{211\}\langle 011\rangle$ ,

(4) X-ray random intensity ratio of  $\{100\}\langle 011\rangle$  is 2.5 or more,

having at least one of an r-value in a rolling direction and the r-value in a direction perpendicular to the rolling direction is 0.7 or less,

having anisotropy of uniform elongation  $\Delta uE1$  is 4% or less,

having an anisotropy of local elongation  $\Delta LE1$  is 2% or more, and

having an  $\Delta uE1$  which is  $\Delta LE1$  or less,

where:

$$\Delta uE1 = \{ |uE1(L) - uE1(45^\circ)| + |uE1(C) - uE1(45^\circ)| \} / 2$$

$$\Delta LE1 = \{ |LE1(L) - LE1(45^\circ)| + |LE1(C) - LE1(45^\circ)| \} / 2$$

$uE1(L)$ : Uniform elongation in a rolling direction

uE1(C): Uniform elongation in a transverse direction

uE1(45°): Uniform elongation in a 45° direction

LE1(L): Local elongation in a rolling direction

LE1(C): Local elongation in a transverse direction

LE1(45°): Local elongation in a 45° direction.

2. (original) A high-strength hot-rolled steel sheet excellent in shape fixability according to claim 1, characterized in that an occupancy rate of iron carbide, diameter of which is 0.2  $\mu$ m or more, is 0.3% or less.

3. (original) A high-strength hot-rolled steel sheet excellent in shape fixability according to claim 1, characterized in that an aging index AI is 8 MPa or more.

4. (original) A high-strength hot-rolled steel sheet excellent in shape fixability according to claim 1, characterized by containing, in terms of weight %,

C: 0.01 to 0.2%,

Si: 0.001 to 2.5%,

Mn: 0.01 to 2.5%,

P: 0.2% or less,

S: 0.03% or less,

Al: 0.01 to 2%,

N: 0.01% or less, and

O: 0.01% or less

and remainder Fe and unavoidable impurities.

5. (original) A high-strength hot-rolled steel sheet excellent in shape fixability according to claim 4, characterized by further containing at least one or more element selected from Nb, Ti and V with a total of 0.001 to 0.8%, in terms of weight %.

6. (currently amended) A high-strength hot-rolled steel sheet excellent in shape fixability according to claim 4 ~~or 5~~, characterized by further containing at least one or more, in terms of weight %,

B: 0.01% or less,

Mo: 1% or less,

Cr: 1% or less,  
Cu: 2% or less,  
Ni: 1% or less,  
Sn: 0.2% or less,  
Co: 2% or less,  
Ca: 0.0005 to 0.005%,  
Rem: 0.001 to 0.05%,  
Mg: 0.0001 to 0.05%,  
Ta: 0.0001 to 0.05%.

7. (original) A high-strength hot-rolled steel sheet excellent in shape fixability according to claim 1, characterized by containing, in terms of weight %,

C: 0.02 to 0.3%,

at least one or more element selected from the following group consisting of, total 0.1 to 3.5%, in terms of weight %,

Mn: 0.05 to 3%,

NI: 3% or less,

Cr: 3% or less,

Cu: 3% or less,

Mo: 1% or less,

Co: 3% or less and

Sn: 0.2% or less,

at least one or both consisting of, total 0.02 to 3% in terms of weight %,

Si: 3% or less and

Al: 3% or less

and remainder Fe and unavoidable impurities, and having multi-phase structure, wherein ferrite or bainite is the maximum phase in terms of percent volume, and a percent volume of martensite is 1 to 25%.

8. (original) A high-strength hot-rolled steel sheet excellent in shape fixability according to claim 7, characterized by containing, in terms of weight %, at least one or more element selected from Nb, Ti and V with a total of 0.001 to 0.8%, in terms of weight %.

9. (currently amended) A high-strength hot-rolled steel sheet excellent in shape fixability according to claim 7 ~~or 8~~, characterized by further containing at the least of one or more element selected from the following group consisting of, in terms of weight %,

P: 0.2% or less,

B: 0.01% or less,

Ca: 0.0005 to 0.005% and

Rem: 0.001 to 0.02%

10. (currently amended) A high-strength hot-rolled steel sheet excellent in shape fixability according to claim 4 ~~or 5~~, wherein the steel sheet is plated.

11. (currently amended) A high-strength hot-rolled steel sheet excellent in shape fixability according to claim 7 ~~or 8~~, wherein the steel sheet is plated.

12. (currently amended) A method of producing a high-strength hot-rolled steel sheet excellent in shape fixability comprising the following steps,

hot-rolling a cast slab having a composition according to claim 4 ~~or 5~~ as cast or cooled once, then reheated to a temperature range of 1000-1300°C, with a total reduction ratio of 25% or more at  $Ar_3$  to  $(Ar_3+150)^\circ C$ , temperature at finishing hot-rolling start, TFS, and temperature at finishing hot-rolling end, TFE, simultaneously satisfies following Equations (1) to (4), and

cooling hot-rolled steel sheet, then

coiling at below critical temperature  $T_0$  determined by the chemical composition of the steel sheet shown in the following Equation (5) and a temperature of 400 to 700°C,

$$TFE \geq Ar_3 \quad (1)$$

$$TFE \geq 800^\circ C \quad (1')$$

$$TFS \leq 1100^\circ C \quad (2)$$

$$20^\circ C \leq TFS - TFE \leq 120^\circ C \quad (4)$$

$$T_0 = -650.4 \times \{C\% / (1.82 \times C\% - 0.001)\} + B \quad (5)$$

where B is found from the composition of the steel expressed by weight %

$$B = -50.6 \times \text{Mn}\% + 894.3$$

$$\text{Mn}\% = \text{Mn}\% + 0.24 \times \text{Ni}\% + 0.13 \times \text{Si}\% + 0.38 \times \text{Mo}\% + 0.55 \times \text{Cr}\%$$

$$+ 0.16 \times \text{Cu}\% - 0.50 \times \text{Al}\% - 0.45 \times \text{Co}\% + 0.90 \times \text{V}\%$$

$$\text{Ar}_3 = 901 - 325 \times \text{C}\% + 33 \times \text{Si}\% + 287 \times \text{P}\% + 40 \times \text{Al}\%$$

$$- 92 \times (\text{Mn}\% + \text{Mo}\% + \text{Cu}\%)$$

$$- 46 \times (\text{Cr}\% + \text{Ni}\%)$$

13. (original) A method of producing a high-strength hot-rolled steel sheet excellent in shape fixability according to claim 12, characterized by further controlling a friction coefficient to not more than 0.2 in at least one pass in the hot-rolling in a temperature range of  $\text{Ar}_3$  to  $(\text{Ar}_3 + 150)^\circ\text{C}$ .

14. (original) A method of producing a high-strength hot-rolled steel sheet excellent in shape fixability characterized by applying skin pass rolling of 0.1 to 5% to hot-rolled steel sheet produced by the method of producing a high-strength hot-rolled steel sheet excellent in shape fixability according to claim 12.

15. (currently amended) A method of producing a high-strength hot-rolled steel sheet excellent in shape fixability comprising the following steps,

hot-rolling a cast slab having a composition according to claim 7 ~~or 8~~ as cast or cooled once, then reheated to a range of 1000 to 1300°C, with a total reduction ratios of 25% or more at  $\text{Ar}_3$  to  $(\text{Ar}_3 + 150)^\circ\text{C}$ , temperature at finishing hot-rolling start, TFS, and temperature at finishing hot-rolling end, TFE, and calculated residual strain  $\Delta\epsilon$  to simultaneously satisfy following relations (1) to (4), and

cooling hot-rolled steel sheet, then

coiling at below critical temperature  $T_0$  determined by the chemical composition of the steel shown in the following relation (5) and a temperature of not more than 400°C:

$$TFE \geq Ar_3 (^{\circ}C) \quad (1)$$

$$TFS \leq 1100^{\circ}C \quad (2)$$

$$\Delta \epsilon \geq (TFS - TFE) / 375 \quad (3)$$

$$20^{\circ}C \leq (TFS - TFE) \leq 120^{\circ}C \quad (4)$$

$$T_0 = -650.4 \times \{C\% / (1.82 \times C\% - 0.001)\} + B \quad (5)$$

where, B is found from the composition of the steel expressed by weight%,

$$B = -50.6 \times Mneq + 894.3$$

$$Mneq = Mn\% + 0.24 \times Ni\% + 0.13 \times Si\% + 0.38 \times Mo\% + 0.55 \times Cr\% \\ + 0.16 \times Cu\% - 0.50 \times Al\% - 0.45 \times Co\% + 0.90 \times V\%$$

where,

$$Ar_3 = 901 - 325 \times C\% + 33 \times Si\% + 287 \times P\% + 40 \times Al\% - 92 \\ \times (Mn\% + Mo\% + Cu\%) - 46 \times (Cr\% + Ni\%)$$

$\Delta \epsilon$  is found from the equivalent strain  $\epsilon_i$  ( $i$  is 1 to  $n$ ) given at each stand of the  $n$  stages of finishing rolling for the rolling, time  $t_i$  (sec) ( $i=1$  to  $n-1$ ) between stands, time  $t_n$  (sec) from the final stand to the start of cooling, rolling temperature  $T_i$  (K) ( $i=1$  to  $n$ ) at each stand, and a constant  $R=1.987$ .

$$\epsilon = \Delta \epsilon_1 + \Delta \epsilon_2 + \dots + \Delta \epsilon_n$$

$$\text{where, } \Delta \epsilon_i = \epsilon_i \times \exp\{-(t_i^* / \tau_n)^{2/3}\}$$

$$\tau_n = 8.46 \times 10^{-9} \times \exp\{43800 / R / T_i\}$$

$$t_i^* = \tau_n \times (t_i / \tau_i + t_{(i+1)} / \tau_{(i+1)} + \dots + t_n / \tau_n)$$

16. (original) A method of producing a high-strength hot-rolled steel sheet excellent in shape fixability according to claim 15, characterized by further controlling a friction coefficient to not more than 0.2 in at least one pass in the hot-rolling in a temperature range of  $Ar_3$  to  $(Ar_3 + 150)^{\circ}C$ .

17. (original) A method of producing a high-strength hot-rolled steel sheet excellent in shape fixability characterized by applying skin pass rolling of 0.1 to 5% to hot-rolled steel sheet produced by the method of producing a high-strength hot-

rolled steel sheet excellent in shape fixability according to claim 15.